
Partnering on EIC Interaction Region Magnets

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Deep, Firsthand Knowledge of the EIC IR



Lead Design of the EIC Interaction Region

Directly involved in the design of the EIC IR magnets
- not arriving fresh to the problem.



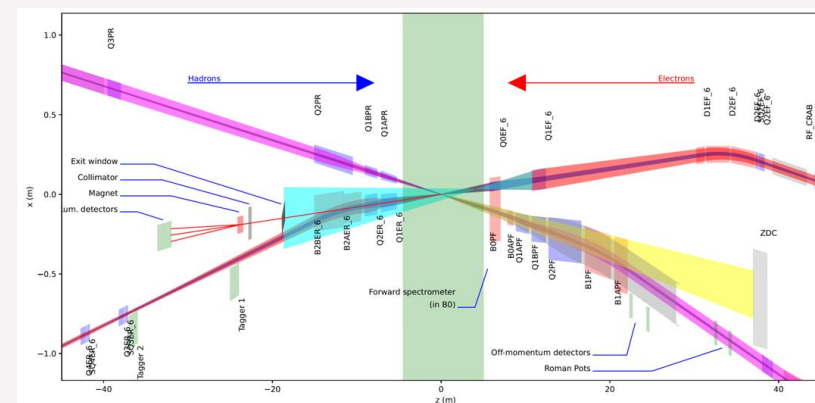
Intimate knowledge of the IR

First-hand understanding of the physics requirements, field-quality tolerances, and integration constraints that drive the design.



Continuity, not a cold start

An MIT collaboration builds directly on that original design effort - minimal ramp-up, immediate technical traction.



EIC Interaction Region (IP6)

Overview of the IR layout

Magnet Technology Expertise Spanning Nearly a Decade

Continuous high-field magnet R&D at MIT, with a team ready to support EIC IR magnets today.

1930s

1960s– present

Today

Now

Francis Bitter pioneers
high-field magnet R&D at
MIT

MIT Francis Bitter / Plasma
Science and Fusion Center
sets DC field records

HTS magnet program for
SPARC: next-gen
superconducting fusion
magnets

Team ready to support
EIC IR magnet design &
test

90+

years of continuous high-field
magnet research and
engineering at MIT



Team of magnet scientists and engineers -
design, analysis, and fabrication -
available now to support EIC IR effort

Momentum Already Underway



Framework Agreement Signed

MIT Bates Director Bolek Wyslouch and EIC Project Director Jim Yeck have signed a framework agreement to formalize collaboration between MIT and the EIC project on 7/25/2026.

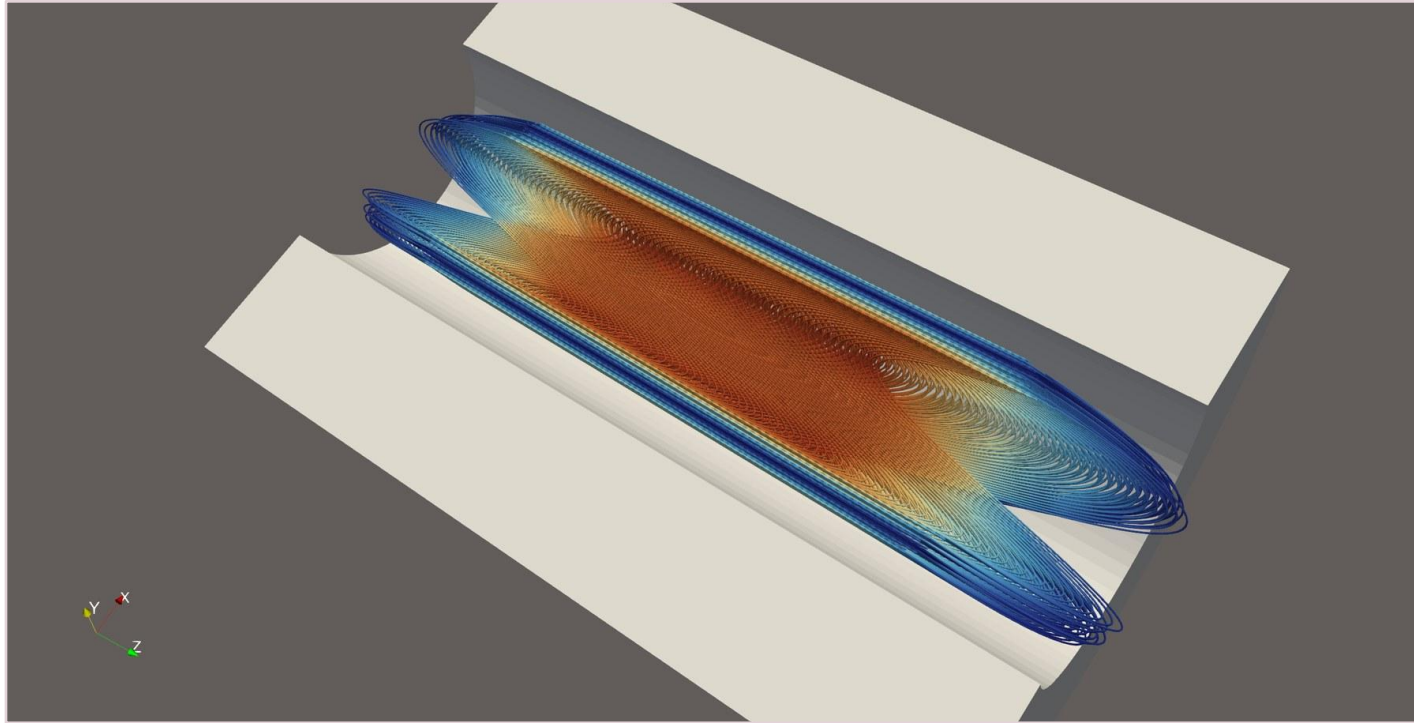


Strategic Partnership with MIT PSFC

MIT LNS has also formed a strategic partnership with MIT's Plasma Science and Fusion Center - broadening the collaboration beyond LNS.

The framework - and the path to work together on IR magnets - is already in place.

A Result Already in Hand: Q1ABpF



Q1ABpF — tapered CCT quadrupole/dipole magnet, field simulation

Concept: tapered CCT (canted-cosine-theta) magnet, my design

Analysis by my old group at BNL
(Magnet Systems Group)

Built and recently tested by BNL's
Superconducting Magnet Division

1360A

design field current

6 T

peak field on the wire

*A concept I originated, designed, and
helped bring to a successful test - start
to finish.*

Technology and Facilities Ready Today

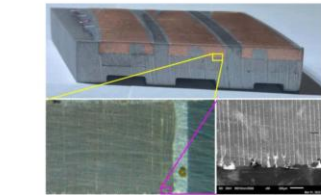
The TFMC is a large scale 20 T no-insulation REBCO magnet



Nominal Design Parameter	Value
Number of pancakes	16
Total turns	256
Total REBCO tape	270 km
Operating temperature	20 K
Coolant type	Supercrit. He
Operating coolant pressure	20 bar (max)
Operating terminal current	40 kA
Peak magnetic field	20 T
Peak $\times B$ force on REBCO	800 kN/m
Inductance	0.14 H
Magnetic stored energy	110 MJ
WP mass	5,113 kg
WP current density	153 A/mm ²
WP + case mass	10,058 kg
WP + case linear size	2.9 x 1.9 m

Full-Scale HTS Magnet Technology

The Toroidal Field Model Coil (TFMC) effort at MIT PSFC — a full-scale HTS magnet, designed, built, and tested in-house.



Mechanical stabilization of HTS stack



VPI solder assembly (MIT)

A Technique Worth Sharing

A VPI (vacuum-pressure-impregnated) conductor joint/soldering technique developed at PSFC — potentially useful for EIC magnets.



Test Infrastructure, Ready Now

MIT's equipment, including a newly commissioned helium liquefier — ready to support full-scale magnet testing today.

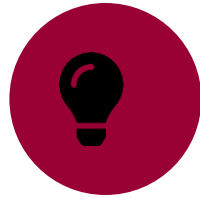
What We're Proposing

A concrete next step, not just a conversation.



Design

MIT designs a demonstrator IR-class magnet



Build

Built using MIT and partner-lab capabilities



Test

Tested at MIT's own facilities



Deliver Confidence

Proof of capability

MIT has offered to design, build, and test a demonstrator magnet to prove these capabilities for the EIC.